CLAIMS

We claim:

1. A method for enhanced Capon beamforming, comprising the steps of:

providing a sensor array including a plurality of sensor elements, wherein an array steering vector corresponding to a signal of interest (SOI) is unknown;

bounding a covariance matrix fitting relation for said array steering vector by constraining said array steering vector using a constant norm and a spherical uncertainty set, and

solving said matrix fitting relation to provide an estimate of said array steering vector.

2. The method of claim 1, further comprising the step of determining a power of said SOI, said step of determining power including adjustment for said estimated array steering vector.

3. The method of claim 2, further comprising the step of determining a direction of arrival (DOA) of said SOI from said SOI power.

4. The method of claim 1, wherein said method is used to determine a weight vector for said sensor array.

5. The method of claim 4, further comprising the step of determining a waveform of said SOI from said weight vector.

6. The method of claim 1, wherein said solving step comprises use of the Lagrange Multiplier Method.

7. The method of claim 1, wherein said sensor elements comprise antennas or ultrasound transducers.

8. A sensor-based system, comprising,

a sensor array including a plurality of sensor elements, wherein an array steering vector corresponding to a signal of interest (SOI) is unknown, and

a signal processor communicably connected to said plurality of sensor elements, said signal processor bounding a covariance matrix fitting relation for said array steering vector by constraining said array steering vector using a constant norm and a spherical uncertainty set, and solving said matrix fitting relation to provide an estimate of said array steering vector.

9. The system of claim 8, wherein said sensor system comprises at least one selected from the group consisting of radar, cellular communications, sonar and acoustic imaging.